

Redescription of *Hymenaphorura alticola* (Bagnall, 1935) from the Alps and description of a new related species from the Sudetes, *Hymenaphorura improvisa* sp. n. (Collembola: Onychiuridae)

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Redescription of *Hymenaphorura alticola* (Bagnall, 1935) from the Alps and description of a new related species from the Sudetes, *Hymenaphorura improvisa* sp. n. (Collembola: Onychiuridae). - *Hymenaphorura alticola* (Bagnall, 1935) is redescribed based on material from Switzerland, France, Austria and Italy. A neotype is designated. *Hymenaphorura improvisa* sp. n. from Poland is described and figured.

Key-words: Collembola - Onychiuridae - *Hymenaphorura* – taxonomy - Europe.

INTRODUCTION

During faunistic studies in the Sudetes (SW Poland) some specimens, which fit Bagnall's (1935) description and Gisin's redescription (1953, 1960) of *H. alticola* (Bagnall, 1935), were found. A detailed comparison with Gisin's material which we have obtained thanks to the kindness of Dr. Charles Lienhard from the Muséum d'histoire naturelle (Genève) made it possible to ascertain that the Polish specimens represented a new species and *H. alticola* needed a modern redescription.

***Hymenaphorura alticola* (Bagnall, 1935)**

Material. Neotype – female on slide, by present designation; (CZ 44) Schweiz (Kanton Bern), Berner Jura. Höhle Gitzloch bei Court, 12. IX. 1954, leg. P. Strinati (in collection of the Muséum d'histoire naturelle in Geneva).

Other material examined - 2 females, 1 male juv.; (Fn 7) Suisse (Neuchâtel), Jura neuchâtois, Val de Travers, grotte de Môtiers, 21. VIII. 1952, leg. P. Strinati, 3 males, 3 females; (Jb Rr 1/4 and 1/5) Österreich, Tirol, Zillertaler Alpen, Gegend um Schönbichler Horn, Rossrucken, unterhalb Rossruckspitz, nivale Pionier-Polster, 3100 m, Sommer 1946, leg. H. Janetschek, 3 females; (Jb Rr 4/1) Österreich, Tirol, Zillertaler Alpen, Gegend um Schönbichler Horn, Rossrucken, Schneeboeden, *Polytrichetum sexangularis*, 2620 m, Sommer 1946, leg. H. Janetschek, 5 females; (Kg 191) France (Jura), St. Claude, grotte de la Grusse B, 40 m sous terre, II. 1963, leg. J. Colin, 4 juv.; (Ma 2a) Italie (Dolomites), Marmolada, 2000 m, prairie sur alluvions, 1956, leg. G. Marcuzzi, 2 females, 2 males, 4 juv.; (Ma 5a) Italie (Dolomites), Marmolada, 2100 m, prairie alpine sur roche, 1956, leg. G. Marcuzzi, 1 male, 2 juv.; (Ma 16a) Italie (Dolomites), Marmolada, 2400 m, prairie alpine sur roche, 1956, leg. G. Marcuzzi (the material is preserved in the collection of the Muséum d'histoire naturelle in Geneva).

Diagnosis. *H. alticola* is closely related to *Hymenaphorura creatricis* Pomorski, 1990. Both species have p_3 setae longer than p_2 on abdominal terga I-II, a similar chaetotaxy of abdominal tergum V, the same localisation of microsensillum on antennomere IV and a similar shape and proportions of tibiotarsi and claws. *H. alticola* distinctly differs from *H. creatricis* in its pseudocellar formula (20/111/11112 - *H. alticola*, 10/011/11112 - *H. creatricis*) and finer granulation of terga.

Redescription. Colour in alcohol white. Size, without antennae, 1.6-2.0 mm (neotype female - 2.0 mm). Shape of body cylindrical, as in Fig. 1. Antennae as long as head. Trace of reduced furca in shape of 2 symmetrical small patches of fine granulation with 2 small setae posteriorly. Granulation of dorsal side of the body very fine - usually 12-13 grains around each pseudocellus. Granular areas almost invisible.

Antennal III sense organ consists of 5 relatively long papillae; 2 sensory rods; 2 finely granulated, ovoid sensory clubs; 4 guard setae. Antennal segment IV with subapical organite and microsensillum at level of first row of setae. On antennal segment III microsensillum localised laterally, slightly below antennal III sense organ (Fig. 3).

Postantennal organ in a long cuticular groove, with 11 (9-16) simple vesicles (Fig. 2). Labium without lateral papilla E.

Pseudocellar formula 20/111/11112, ventral pso absent. Parapseudocellar formula typical for the genus - dorsally 01/111/1111, ventrally 1/000/11111. Parapseudocelli on subcoxa and femora invisible.

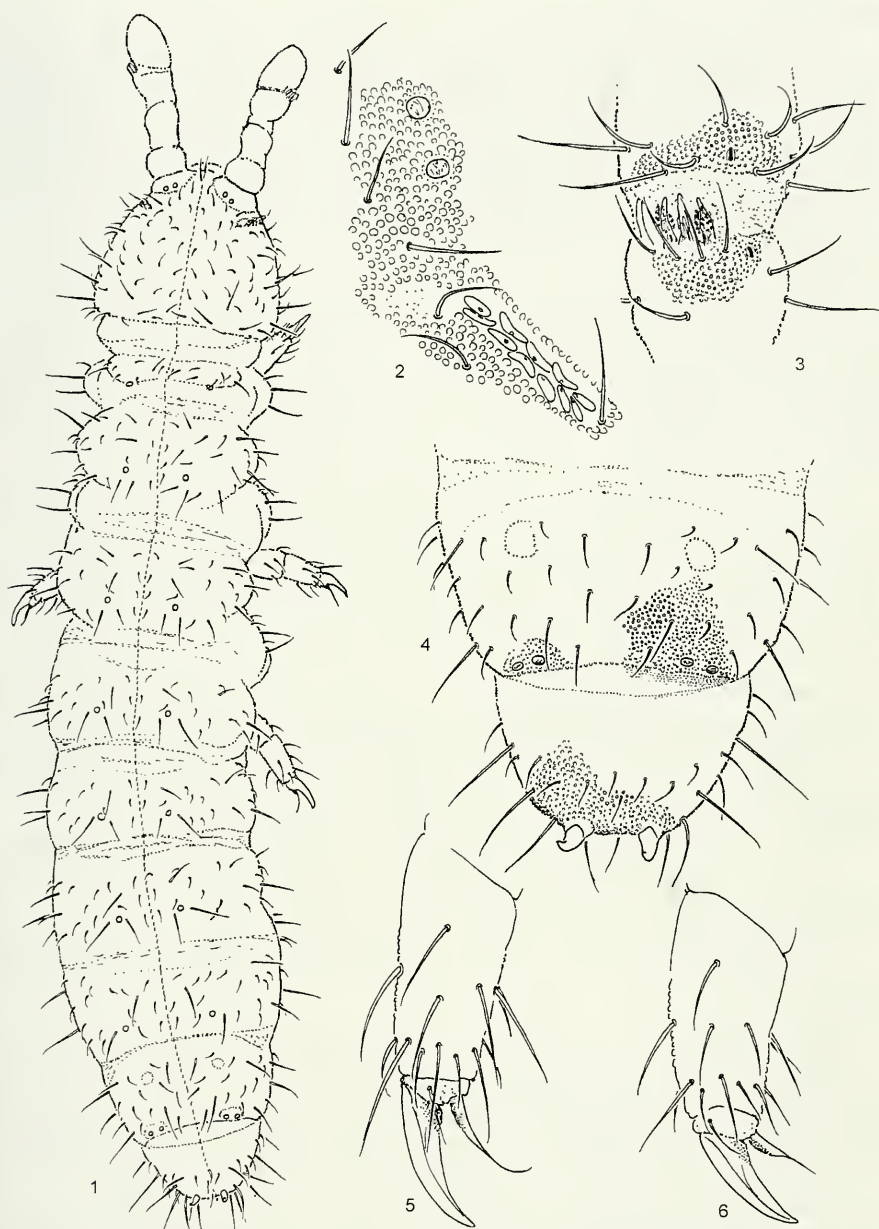
Dorsal chaetotaxy symmetrical, well differentiated into macrochaetae and microchaetae, as in Fig. 1. Thorax II-III with lateral microsensilla. On I-IV abdominal terga, setae p_2 shorter than p_3 . Granular area on abdominal tergum V with 4+4 more or less distinct macrochaetae. Subcoxae with 3, 5 (4), 5 (4) setae, between legs on meso- and metathorax 1+1 setae, tubus ventralis usually with 9+9 setae. Male ventral organ absent.

Claw without denticle. Empodial appendage long with narrow basal lamella, appendage length equal to that of inner edge of claw (Fig. 5) (specimens from Italian Dolomites have a shorter appendage and a slightly broader basal lamella, as in Fig. 6). Distal whorl of setae on tibiotarsi symmetrical, with 11 setae.

Anal spines strong, weakly curved, pointed, with relatively small basal papillae, as long as the claw.

Remarks. Handschin (1920) summarised the knowledge about the fauna of Swiss Onychiuridae and briefly described individuals with 2+2 pseudocelli at the base of antenna as *Onychiurus sibiricus* Tullberg, 1876. Bagnall (1935) pointed out, that "true" *O. sibiricus* had 1+1 pseudocellus at the base of antenna and proposed to classify the individuals examined by Handschin as a new species *Onychiurus alticola*. Later, Gisin (1953, 1960), on the basis of new materials from Austria, France, Switzerland and Italy, redescribed this species.

Examination of Gisin's material allowed us to redescribe this species using a set of modern, diagnostic characters (Pomorski, 1990, 1998). Moreover, we decided to designate of neotype, since Handschin's syntypes could not be located [Dr. Charles Lienhard - Muséum d'histoire naturelle (Genève) and Dr. Daniel H. Burckhardt - Naturhistorisches Museum (Basel); personal communication].



FIGS 1-6. *Hymenaphorura alticola*: 1 - habitus and dorsal chaetotaxy; 2 - postantennal organ and pseudocelli at base of antenna; 3 - antennal III sense organ; 4 - chaetotaxy of abdominal terga V-VI; 5 - tibiotarsus and claw of legs III (specimen from French Jura); 6 - tibiotarsus and claw of legs III (specimen from Italian Dolomites).

Hymenaphorura improvisa sp. n.

Type material. Holotype, male on slide; Poland, Sudetes, Karkonosze Mts., neighbourhood of Szklarska Poreba, 17. X. 1999; flood debris of the river Kamienna, leg. D. Skarzynski. Paratypes 1 male and 3 females on 2 slides, same locality, 10. V. 1999, leg. D. Skarzynski; 4 females on slide, same locality, 15 V 2000, leg. D. Skarzynski; 33 specimens in alcohol, same locality, 15 V 2000, leg. D. Skarzynski (type material preserved in the collection of the Department of Systematic Zoology and Zoogeography, Wrocław University, Poland; one paratype female housed in the collection of the Muséum d'histoire naturelle in Geneva).

Etymology. The species name is derived from Latin word "improvisus" – unexpected.

Diagnosis. Four guard setae in antennal III sense organ, labial lateral papilla E absent, the shape of remnant of furca and the presence of dorso-internal pseudocelli indicate that the new species belongs to the genus *Hymenaphorura*. The new species resembles *H. alticola* only in its pseudocellar formula, but two important characters: 9 setae in the distal whorl of tibiotarsi and the presence of median seta m_0 on abdominal tergum V, place this species in an isolated position within the genus.

Description. Size, without antennae, 1.4-1.5 mm males, 1.5-1.7 mm females (holotype male – 1.5 mm). Colour in alcohol white. Shape of body cylindrical, elongated as in Fig. 7. Antennae as long as head. Trace of reduced furca in shape of small patches of fine granulation with 2 small setae posteriorly. Granulation of the dorsal body side distinct, with very well visible granular areas – usually 10-11 grains around each pseudocellus.

Antennal III sense organ consists of 5 simple papillae; 2 sensory rods; 2 granulated, spherical sensory clubs of which internal is bent; 4 guard setae (Fig. 8).

Antennal segment IV with subapical organite and microsensillum in latero-external position, at level of second row of setae. On antennal segment III microsensillum localised laterally, slightly below antennal III sense organ (Fig. 8).

Postantennal organ in short cuticular groove, with two border setae, composed of 10-11 simple and bilobed vesicles (Fig. 9). Labium without lateral papilla E and usually with thickened and blunt-tipped sensilla on papilla C.

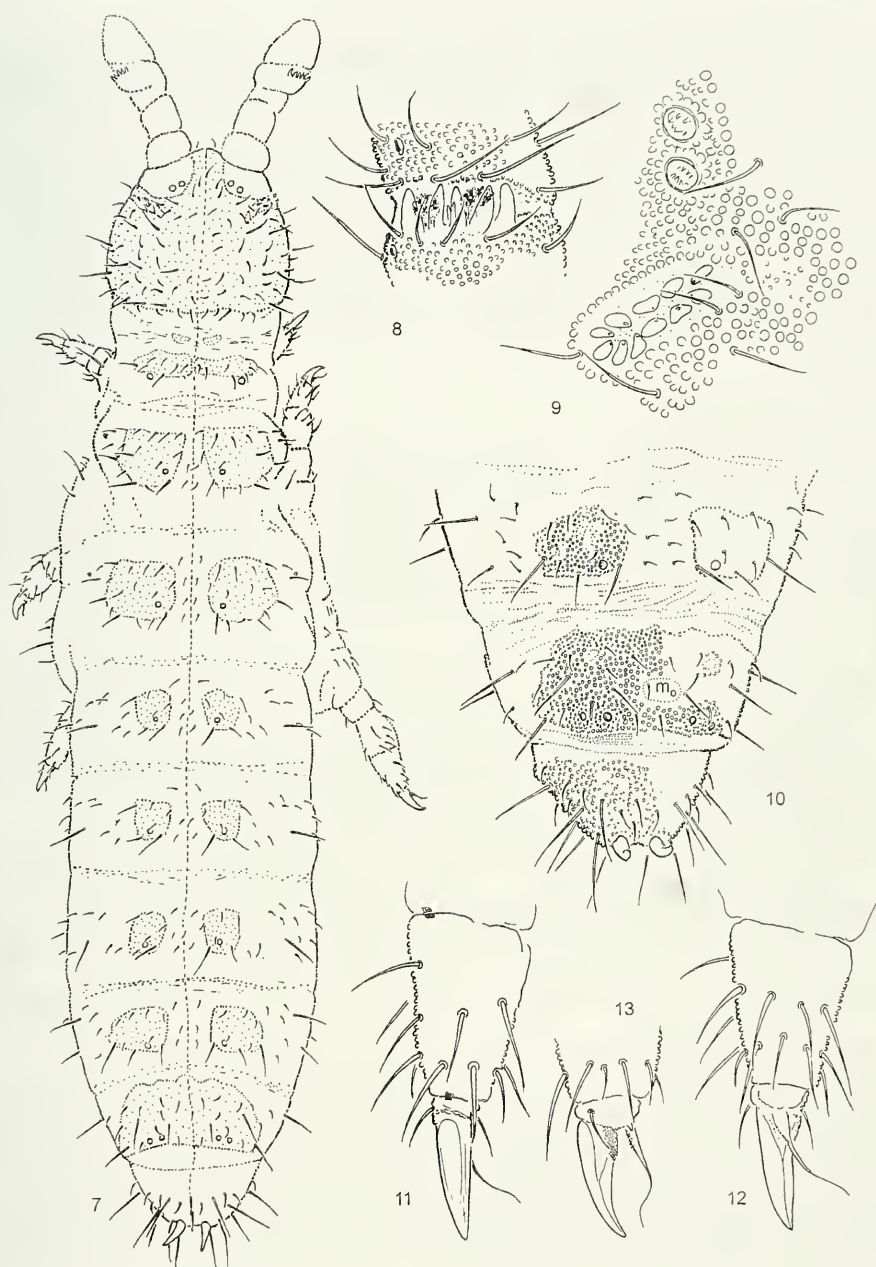
Pseudocellar formula (pso) 20/111/11112, ventral pso absent. Parapseudocelli poorly visible (we are sure of the presence of 1+1 parapseudocelli on abdominal sternum V).

Dorsal chaetotaxy symmetrical, well differentiated into macrochaetae and microchaetae, as in Fig. 7. On abdominal terga I-III, setae p_2 distinctly longer than p_3 . Granular area on abdominal tergum V with 3+3 distinct macrochaetae and median seta m_0 (Fig. 10). Subcoxae with 3, 4, 4 setae. Between legs on meso- and metathorax 1+1 setae. Tubus ventralis with 7+7 (6+6) setae. Male ventral organ absent.

Claws relatively short, always without denticle. Empodial appendages with narrow basal lamella, appendage length equal to that of the inner edge of claw. Distal whorl of setae on tibiotarsi symmetrical, with 9 setae (Figs. 11-13).

Anal spines strong, weakly curved, pointed, with distinct basal papillae, as long as the claw.

Ecological remarks. *H. improvisa* was collected singly in flood debris and numerous under stones on gravel bed of the river Kamienna.



FIGS 7-13. *Hymenaphorura improvisa* sp. n.: 7 - habitus and dorsal chaetotaxy (holotype); 8 - antennal III sense organ; 9 - postantennal organ and pseudocelli at base of antenna; 10 - chaetotaxy of abdominal terga IV-VI; 11 - tibiotarsus and claw of legs III (dorsal side); 12 - tibiotarsus and claw of legs III (ventral side); 13 - claw of legs III.

Discussion. Within the genus *Hymenaphorura* Bagnall, 1948 three species with 2+2 pseudocelli at the base of antenna are known - *Hymenaphorura alticola* (Bagnall, 1935) which lives in Swiss, French, Italian and Austrian Alps (Gisin, 1960), *Hymenaphorura rafalskii* Weiner & Szeptycki, 1997 from Korea and *Hymenaphorura improvisa* sp. n. from Poland. However, they do not constitute a natural group of related species. Besides the common character mentioned above, they differ in some essential, exceptional characters. *H. improvisa* sp. n. is easy to identify based on the presence of 9 setae in the distal whorl of tibiotarsi (in the remaining species 11 setae), the Korean species has 3+3 pseudocelli on abdominal tergum V (in the remaining species 2+2 pseudocelli) and *H. alticola* has p_3 setae longer than p_2 on abdominal terga I-II (in *H. improvisa* p_3 is distinctly shorter than p_2 , in *H. rafalskii* these setae are subequal).

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REFERENCES

- BAGNALL, R. S. 1935. Notes on British Collembola. *Entomologist's Monthly Magazine* 75: 61-63.
- GISIN, H. 1953. Notes sur les Collemboles, avec description de cinq espèces nouvelles, découvertes dans le canton de Genève. *Mitteilungen der Schweizerischen entomologischen Gesellschaft* 26: 56-62.
- GISIN, H. 1960. Collembolenfauna Europas. *Muséum d'histoire naturelle, Genève*, 312 pp.
- HANDSCHIN, E. 1920. Die Onychiurinen der Schweiz. *Verhandlungen der Naturforschenden Gesellschaft in Basel* 32: 1-37.
- POMORSKI, R. J. 1990. New data on the genus *Hymenaphorura* (Collembola, Onychiuridae) from Europe. *Mitteilungen der Schweizerischen entomologischen Gesellschaft* 63: 209-225.
- POMORSKI, R. J. 1998. Onychiurinae of Poland (Collembola: Onychiuridae). *Genus*, supplement: 1-201.